Colorado Division of Reclamation, Mining & Safety

Project Summary

London Butte Mine Reclamation Project

2014, Park County, Colorado

Background

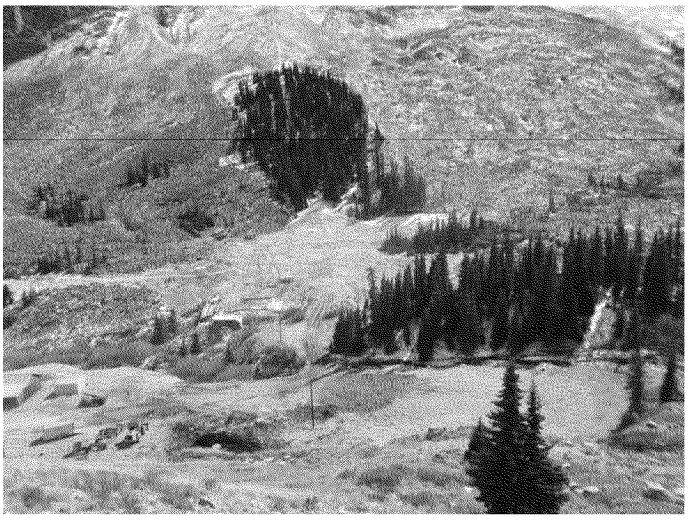
The London Butte mine is approximately four miles west of the Town of Alma in Park County. It is the southernmost of a series of mines along the prominent London Fault. Mining and milling operations have been intermittently active at these mines since 1875. The London Butte site contains two mill tailings piles, historic and well as more modern mining buildings and debris, and extensive waste rock piles that are immediately adjacent to South Mosquito Creek. A large percentage of the waste rock in the stockpiles is dolomitic. The tailings continually leach acidic, metal-laden water into the perennial stream. During high flow, the creek significantly erodes the tailings piles and contributes metal-laden sediment to the creek. In 2011, a massive landslide covered nearly one-half of the Butte tailings material, increasing the rate of tailings erosion and further degrading South Mosquito Creek.

In the early 1980s, Mined Land Reclamation Permit M-1980-250 was issued for modern mining and milling operations at the London Mines. In 1997, the Colorado Mined Land Reclamation Board revoked the permit and forfeited the $12,000 reclamation bond. The bond funds were used to partially stabilize the Butte tailings, but were grossly insufficient to complete reclamation of the overall site to applicable performance standards.

In 2013, Phase I London area mine reclamation project involved reclaiming three tailings piles associated with the London Mine. Phase II of the project focused on the London Butte, and included consolidation of tailings, placement of dolomite cover, capping with clean fill, and revegetation, as well as building demolition and trash removal.

Site Characteristics

In 2011 and 2012, the Division of Reclamation Mining and Safety (DRMS) measured surface water flows and collected water and tailings samples from the London-Butte Mine site. A portable X-ray Fluorescence (XRF) device was used to measure total metal concentrations in the historic tailings deposits at the London Mine and the Butte Mine area. The results of the water sample analyses showed elevated levels of zinc and lead. The XRF of the tailings confirmed the presence of heavy metals.



Top: London Butte Mine before and after reclamation .
Bottom: Trestle at London Butte Mine left for historical significance.

Land Owner
Estate of Benjamin Wright, Jr.

General Contractor
RMC Consultants, Inc.
12295 West 48th Avenue
Wheat Ridge, CO 80033

Total Project Cost: $446,949.00

DRMS Project Managers
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COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

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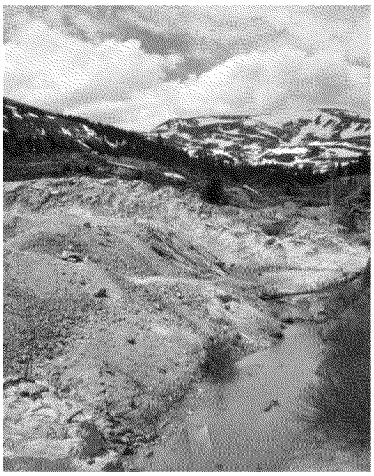
Work Description- Phase II

Contractor mobilization and site preparation began in August of 2014. Tailings were removed from a 2 acre area including a large stockpile near the Butte Mill and from tailings that extended down to South Mosquito Creek. Excavated tailings were placed in the consolidation area developed around and over the old Butte Mill Foundation. A series of underdrains and channels were constructed to intercept and divert ground and surface waters around the tailings consolidation area. Geosynthetic materials were placed over portions of soft subgrade on tailings adjacent to South Mosquito Creek prior to placement of dolomite and clean soil backfill. Tailings were removed from the south bank of Mosquito Creek and the bank was reconstructed with rock, dolomite and clean fill material.

Dolomite material was excavated from banks on the north side of the South Mosquito Creek. The dolomite material was a byproduct of mining the London and London Extension and provided pH buffering to acidic tailings prior to backfill placement. Clean backfill material came from excavation in preparation of the tailings consolidation area and from a borrow source on the north side of South Mosquito Creek. In addition, buildings were demolished and debris/trash were hauled away and disposed at the Summit County Landfill.

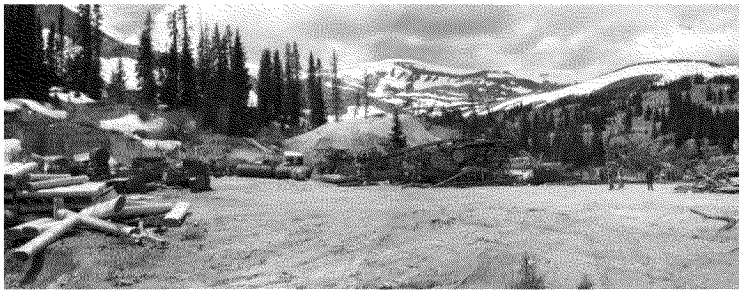
The total area reclaimed in the London Butte Project was 6.0 acres. The work included excavating over 15,000 cubic yards of tailings from the stockpile and removal area with placement in the consolidation area. More than 4,000 cubic yards of dolomite was removed from the creek banks and used as buffering cover, 11,500 cubic yards of clean fill excavated and placed, including selective excavation and placement of rock for stream bank reconstruction.



Left: London Butte Tailings material eroding into South Mosquito Creek, and further accelerated by the 2011 landslide. Photo dated 2012 prior to reclamation.

Below: 2014 London Butte Tailings removed, geogrid placed over soft subgrade and covered with dolomite , clean backfill and composted biosolids. Banks of South Mosquito Creek were reconstructed with riprap and the entire area seeded.

Approximately 1,000 cubic yards of composted biosolids (donated by Freeport McMoRan) were hauled to the site and incorporated into the clean cover soil, and the area was revegetated with a subalpine seed mixture. Funding for the project was obtained from Colorado Water Resources and Power Development Authority, severance tax funds and the Colorado Department of Public Health and Environment to reclaim the site.



Left: London Butte Tailings Material and Debris in 2012.

Right: London Butte Tailings Reclamation completed in 2014.